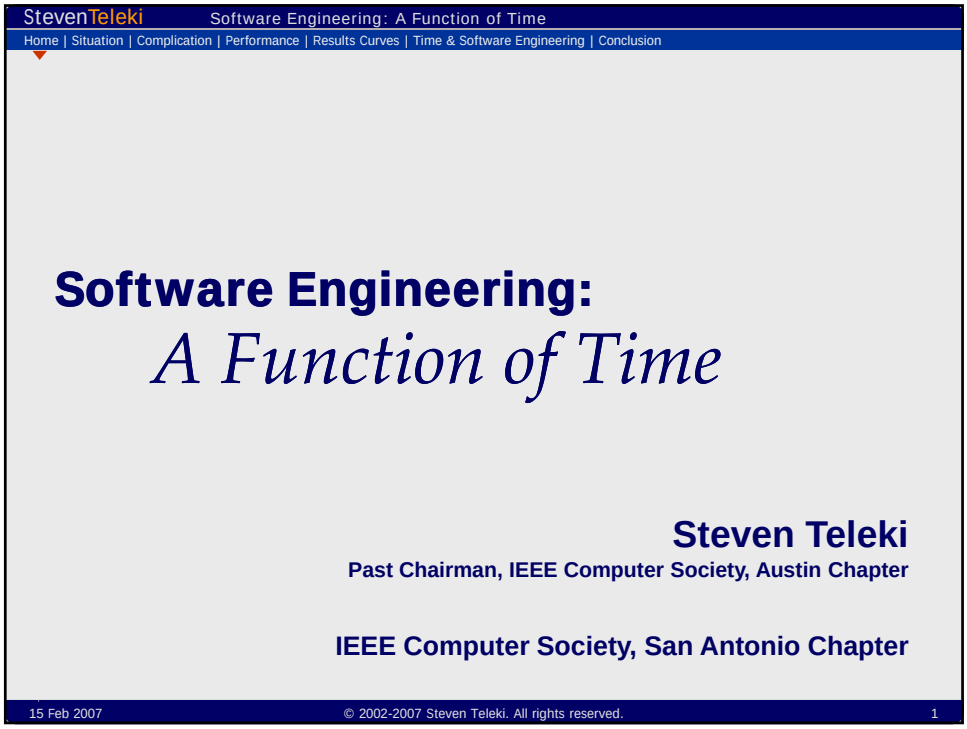
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Software Engineering:
A Function of Time
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Past Chairman, IEEE Computer Society, Austin Chapter
IEEE Computer Society, San Antonio Chapter
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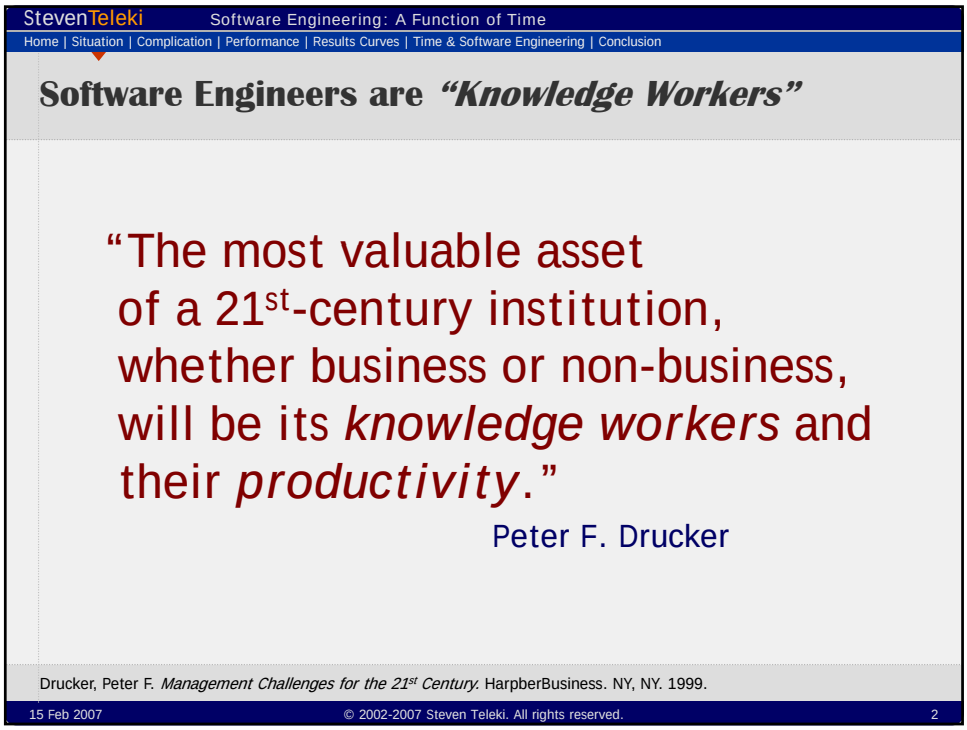
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Software Engineers are "Knowledge Workers"
"The most valuable asset of a 21st-century institution, whether business or non-business, will be its knowledge workers and their productivity."
Peter F. Drucker
Drucker, Peter F. Management Challenges for the 21st Century. HarpberBusiness. NY, NY. 1999.
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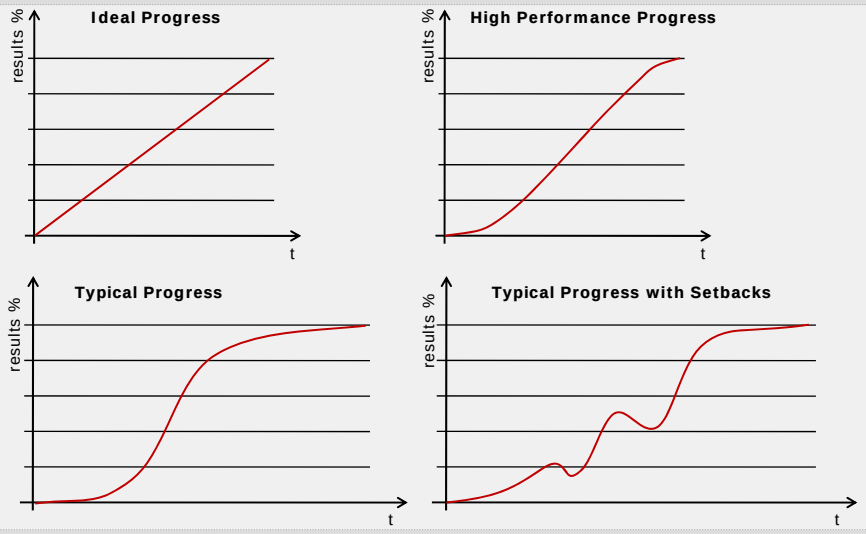
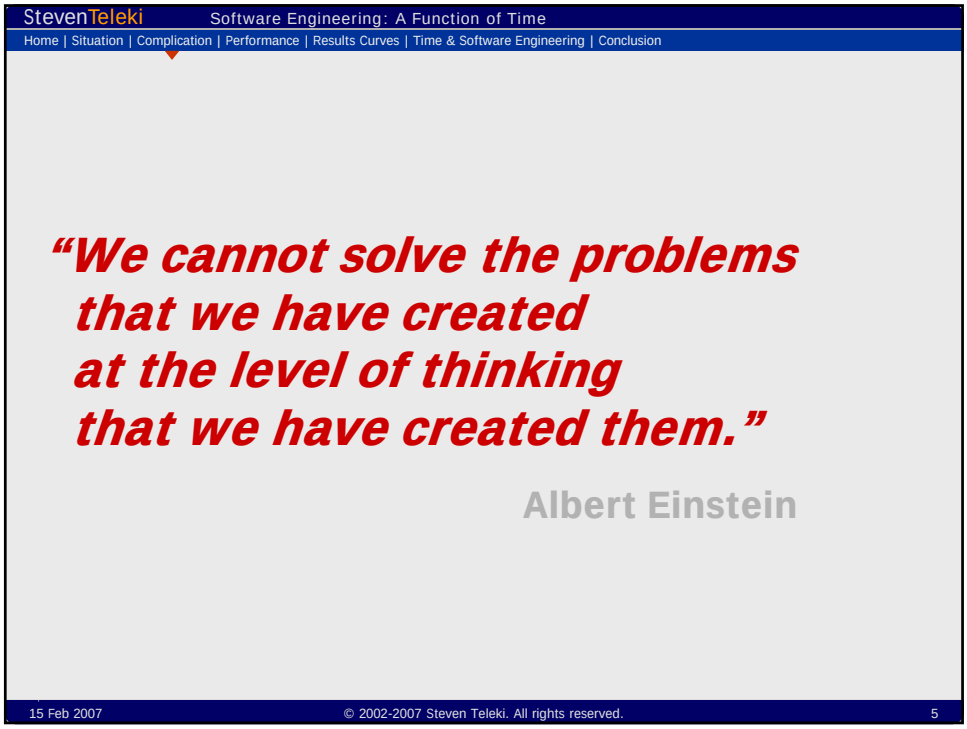
2

What is the Knowledge Worker's Currency?

time

results = f(time)

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"We cannot solve the problems
that we have created
at the level of thinking
that we have created them."
Albert Einstein
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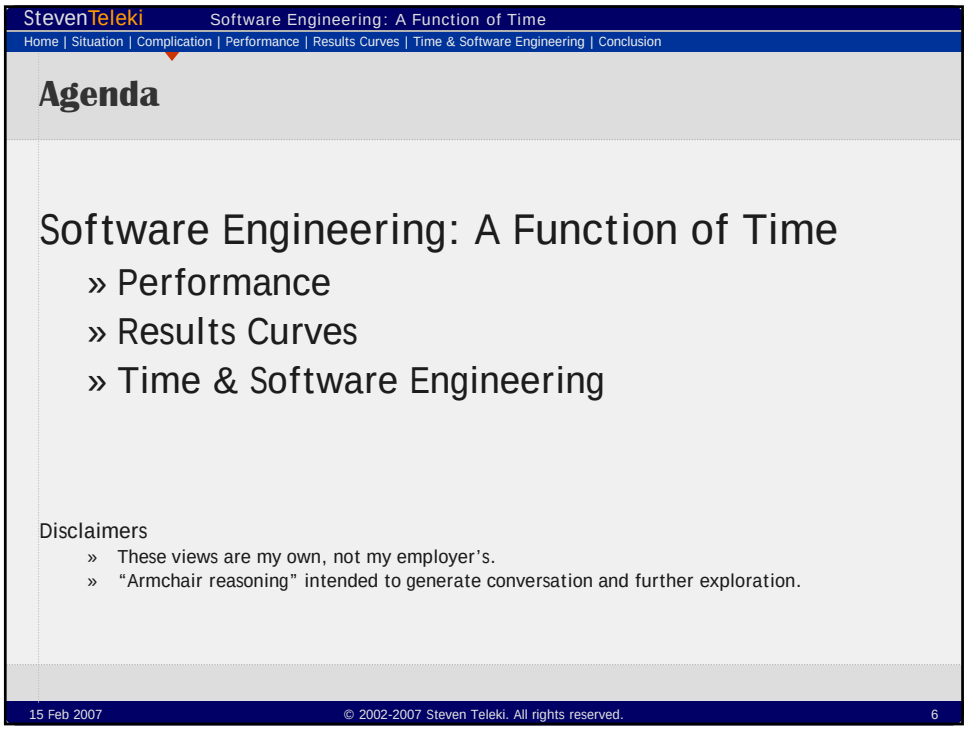
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Agenda
Software Engineering: A Function of Time
» Performance
» Results Curves
» Time & Software Engineering
Disclaimers
» These views are my own, not my employer's.
» "Armchair reasoning" intended to generate conversation and further exploration.
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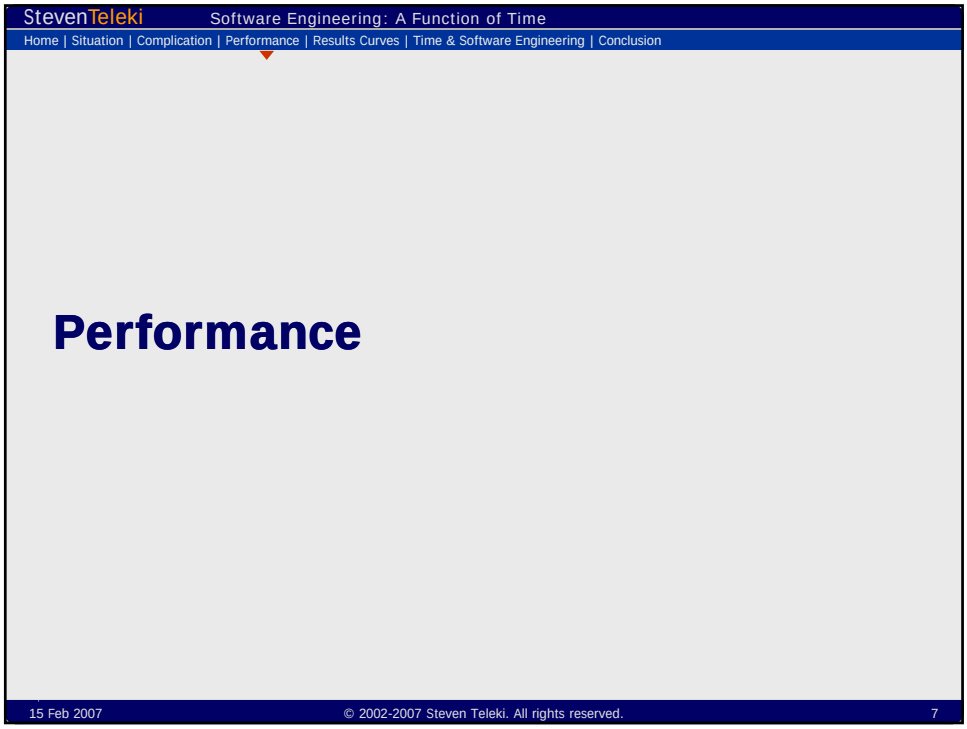
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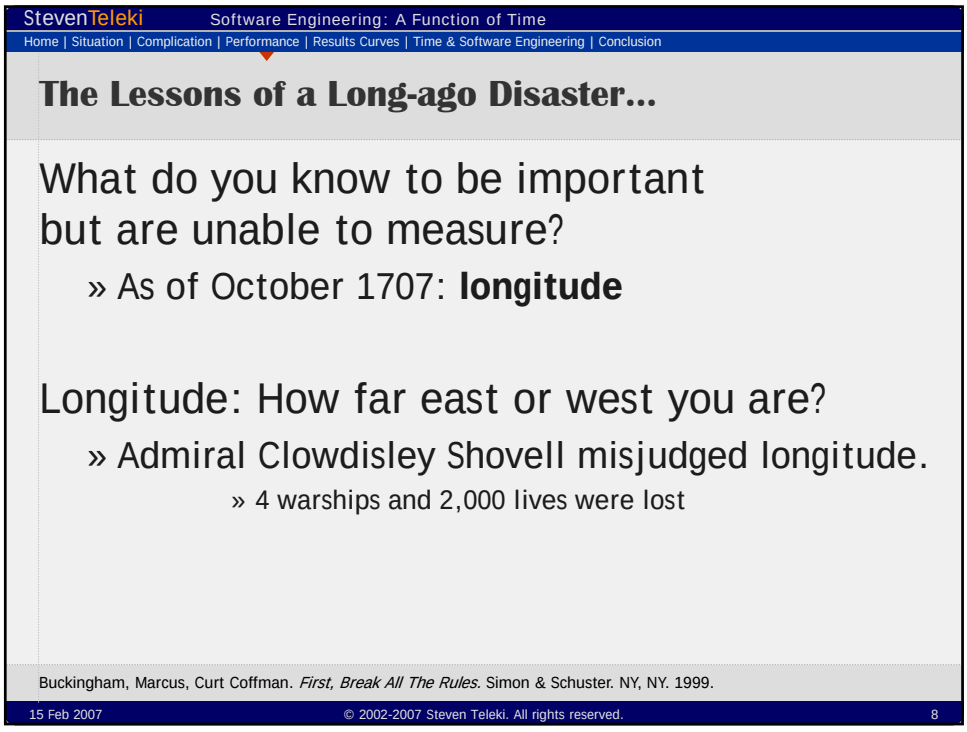
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The Lessons of a Long-ago Disaster...
What do you know to be important but are unable to measure?
» As of October 1707: longitude
Longitude: How far east or west you are?
» Admiral Clowdisley Shovell misjudged longitude.
» 4 warships and 2,000 lives were lost
Buckingham, Marcus, Curt Coffman. First, Break All The Rules. Simon & Schuster. NY, NY. 1999.
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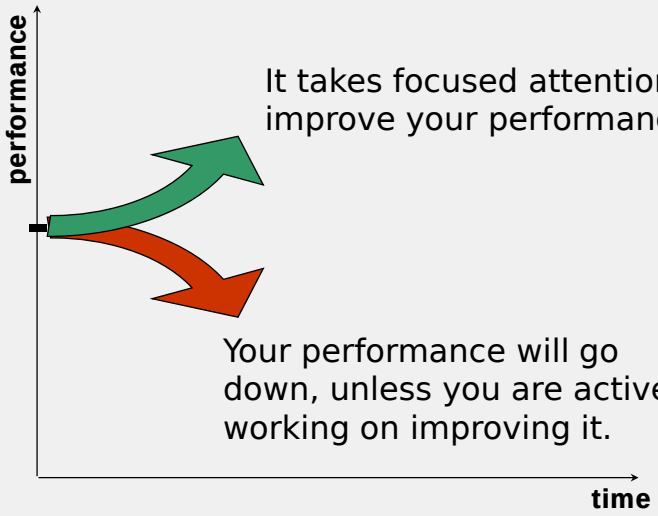
What is Your Software Development Performance?

Have you been thinking about it before?

» Do you know your "**batting average**?"

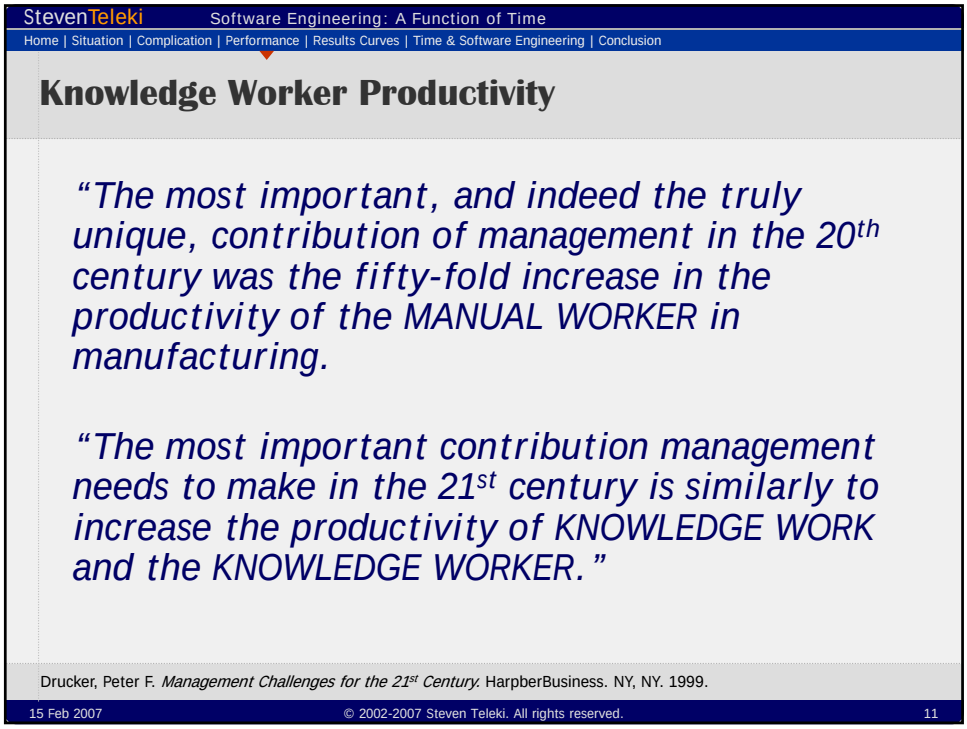
Software Development Performance is the complexity of all activities that an individual or team does in order to create software.

There Is NO Constant Performance!



It takes focused attention to improve your performance.

Your performance will go down, unless you are actively working on improving it.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Knowledge Worker Productivity
"The most important, and indeed the truly unique, contribution of management in the 20th century was the fifty-fold increase in the productivity of the MANUAL WORKER in manufacturing.
"The most important contribution management needs to make in the 21st century is similarly to increase the productivity of KNOWLEDGE WORK and the KNOWLEDGE WORKER."
Drucker, Peter F. Management Challenges for the 21st Century. HarpberBusiness. NY, NY. 1999.
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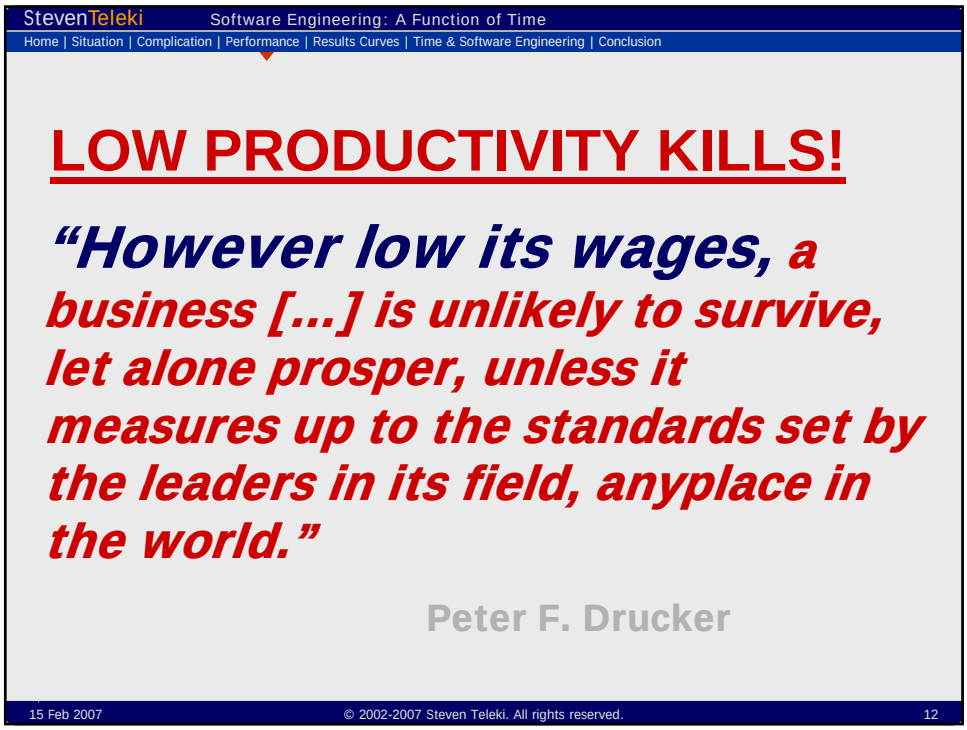
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LOW PRODUCTIVITY KILLS!
"However low its wages, a business [...] is unlikely to survive, let alone prosper, unless it measures up to the standards set by the leaders in its field, anyplace in the world."
Peter F. Drucker
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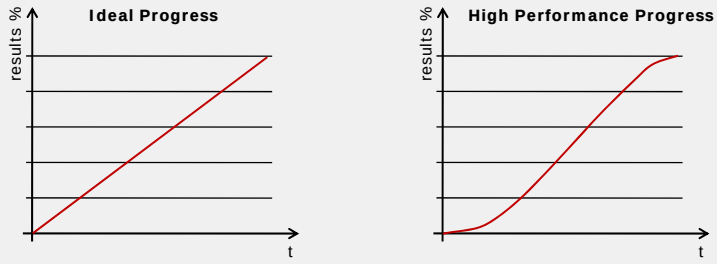
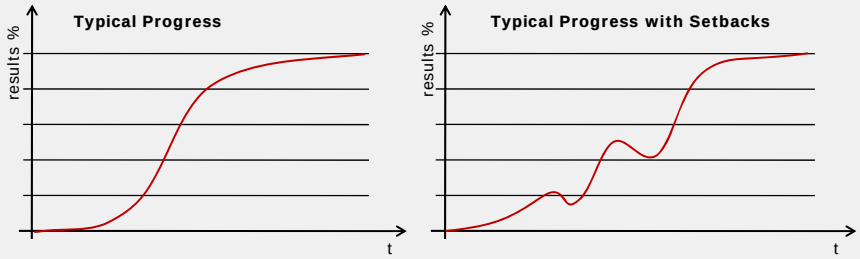
Results Curves

Well-Run Teams



- Ideal Progress: Steady, linear progress toward the finish line.
- High-Performance Progress: Close to ideal, slower to start, and slows down before finish

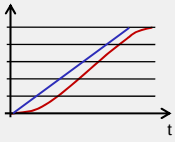
Typical Project Team



- Typical Progress: Slow start, fast progress in the middle, gets bogged down in testing and debugging at the end.
- Progress with Setbacks: New work is continuously discovered.

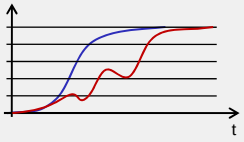
Differences between Well-Run and Typical Projects

Well-Run Project



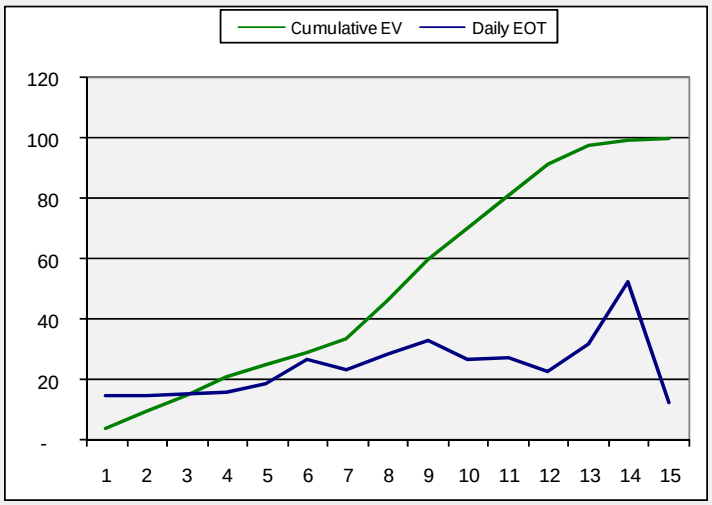
- ✓ Clear idea of skills & capabilities
- ✓ Ready to learn
- ✓ Low defect density in system test

Typical Project

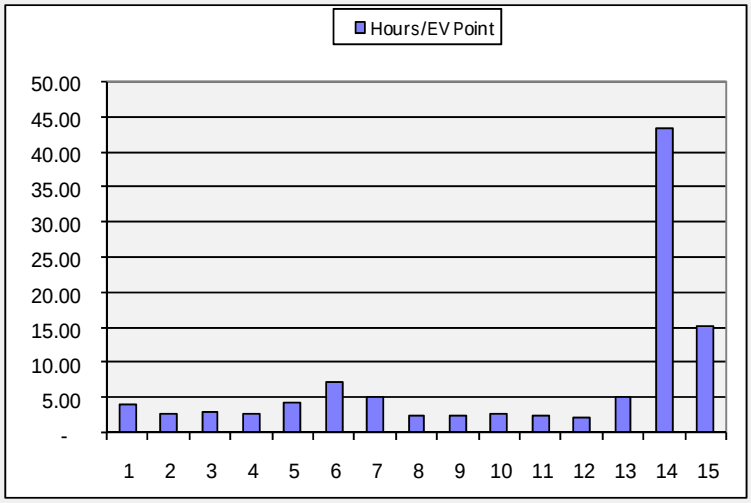


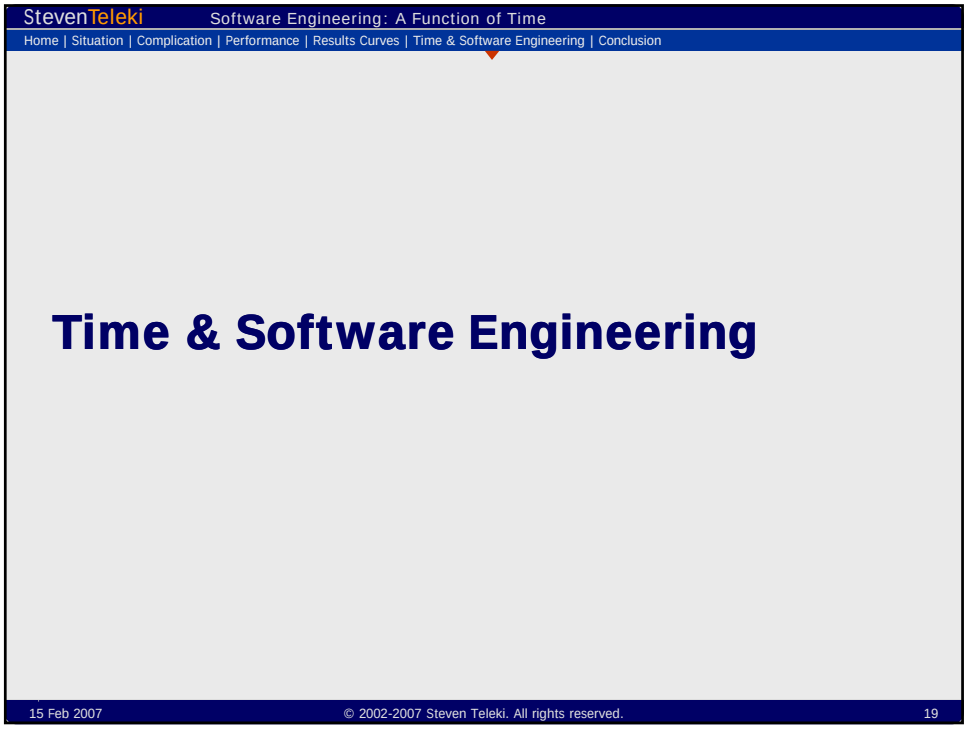
- ✓ Unrealistic expectations of perfection
- ✓ Unable to define work
- ✓ Bogged down in testing & debugging

Cumulative Earned Value, Daily Effective On-Task Time



Hours/Earned Value Point

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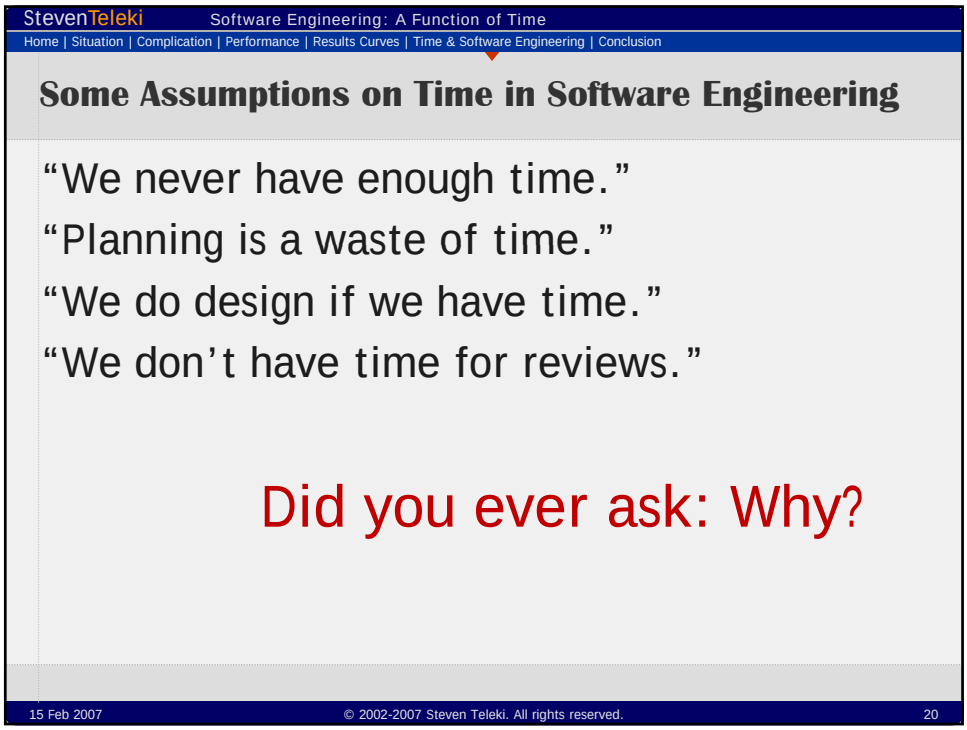
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Some Assumptions on Time in Software Engineering
"We never have enough time."
"Planning is a waste of time."
"We do design if we have time."
"We don't have time for reviews."
Did you ever ask: Why?
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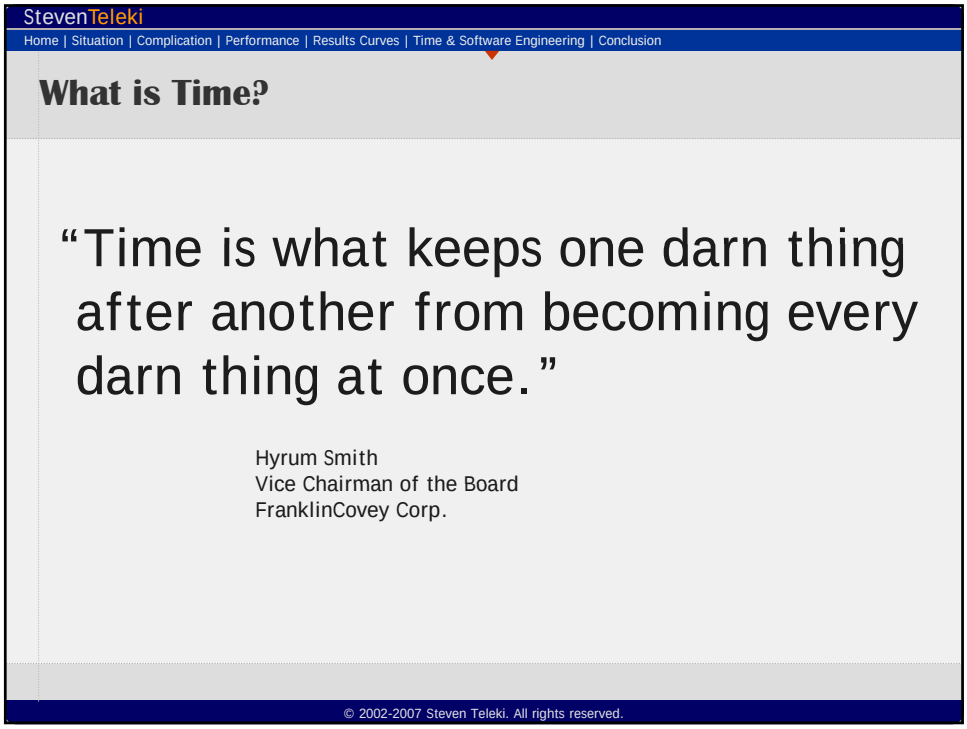
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What is Time?
"Time is what keeps one darn thing after another from becoming every darn thing at once."
Hyrum Smith
Vice Chairman of the Board
FranklinCovey Corp.
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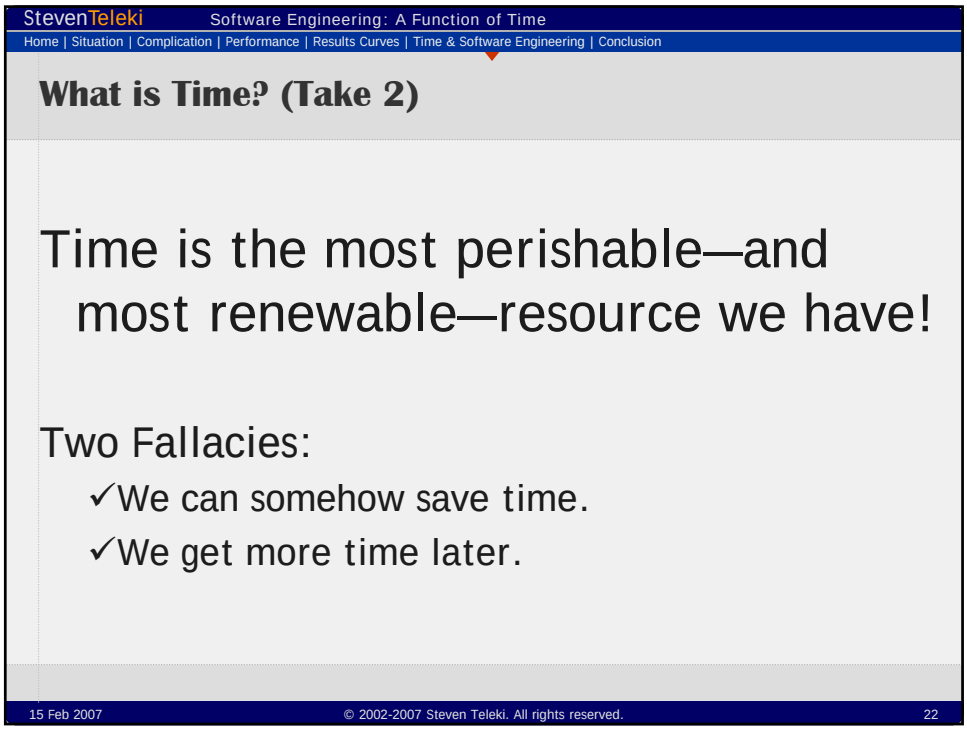
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What is Time? (Take 2)
Time is the most perishable—and most renewable—resource we have!
Two Fallacies:
✓We can somehow save time.
✓We get more time later.
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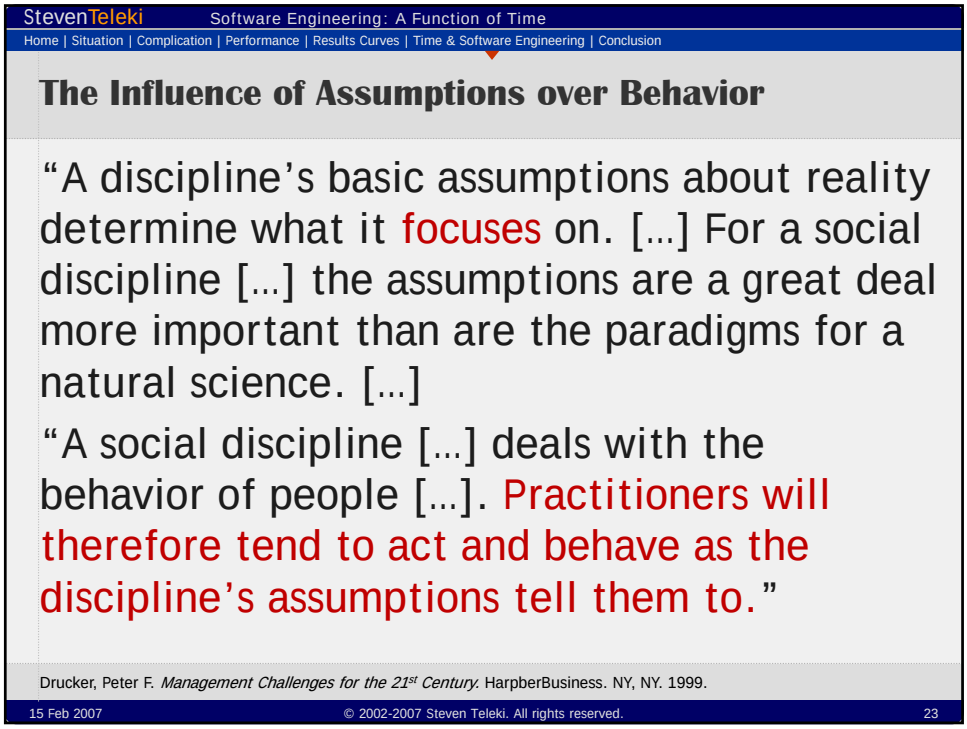
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The Influence of Assumptions over Behavior
"A discipline's basic assumptions about reality determine what it focuses on. [...] For a social discipline [...] the assumptions are a great deal more important than are the paradigms for a natural science. [...]
"A social discipline [...] deals with the behavior of people [...]. Practitioners will therefore tend to act and behave as the discipline's assumptions tell them to."
Drucker, Peter F. Management Challenges for the 21st Century. HarpberBusiness. NY, NY. 1999.
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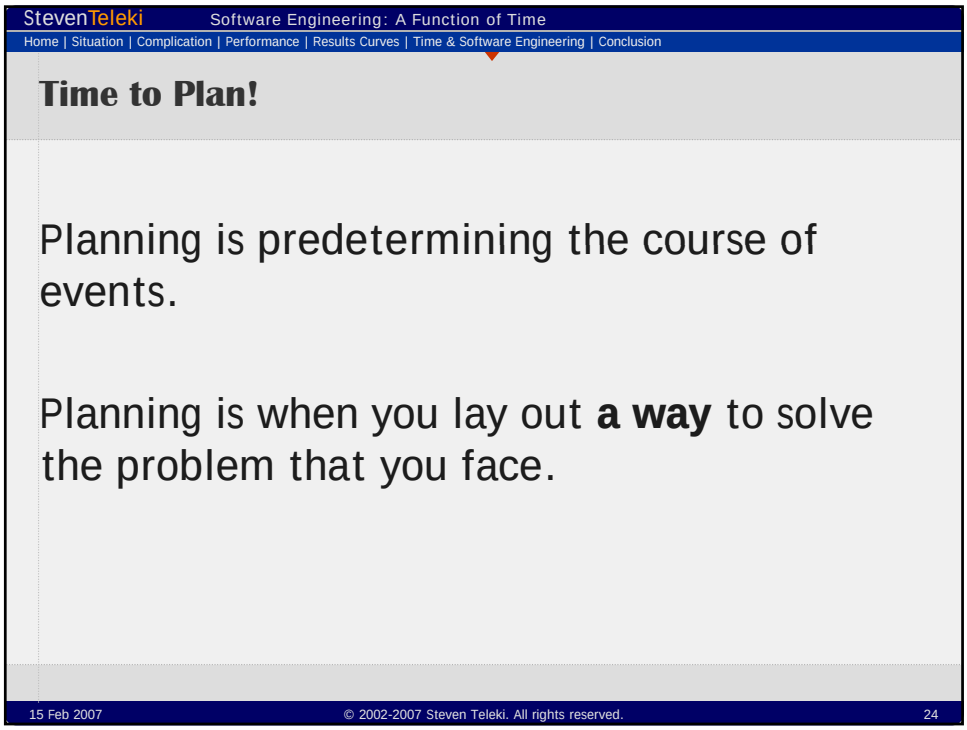
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Time to Plan!
Planning is predetermining the course of events.
Planning is when you lay out a way to solve the problem that you face.
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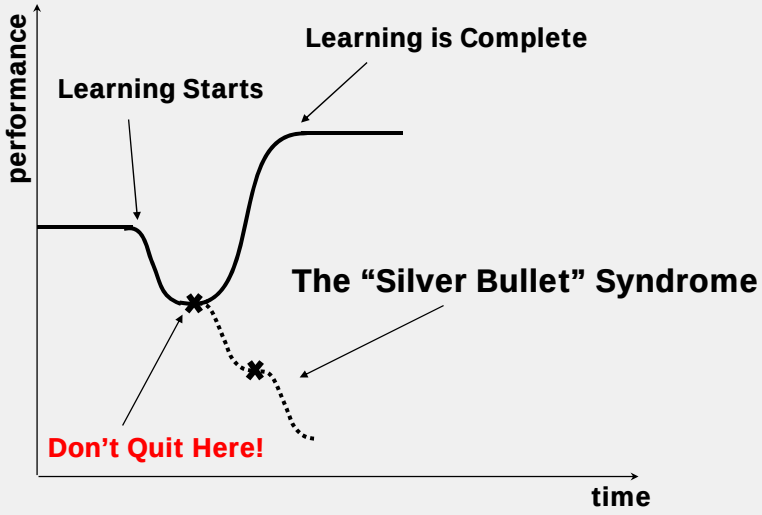
Time to Learn



Time to Learn (continued)

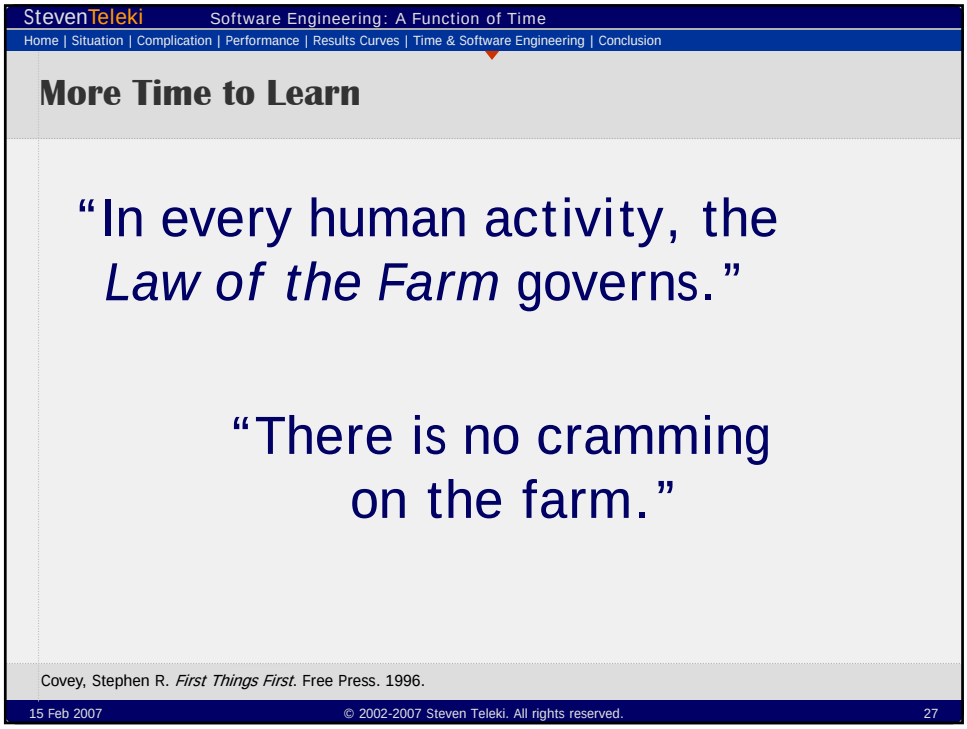
Crawl, walk, run!

An accomplished walker doesn’t think about the mechanics of the steps anymore.

Learning Dilemma

We learn best from experience but we never directly experience the consequences of many of our most important decisions.

Senge, Peter. *The Fifth Discipline.* Pg. 23. Currency Doubleday. New York, NY. 1990.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More Time to Learn
"In every human activity, the *Law of the Farm* governs."
"There is no cramming on the farm."
Covey, Stephen R. *First Things First*. Free Press. 1996.
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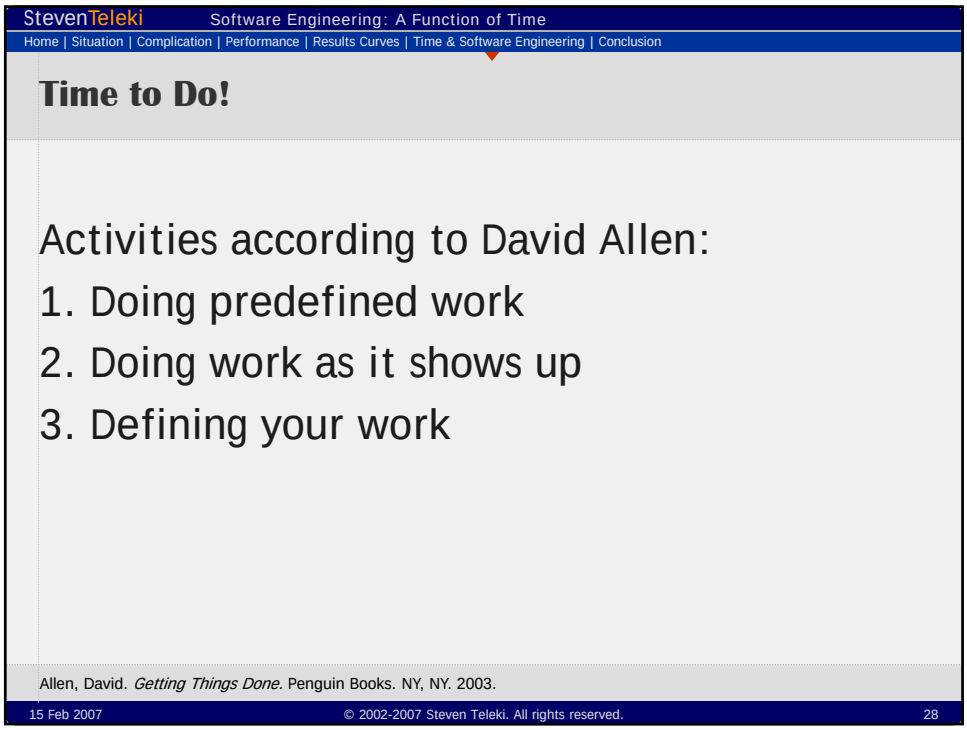
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Time to Do!
Activities according to David Allen:
1. Doing predefined work
2. Doing work as it shows up
3. Defining your work
Allen, David. *Getting Things Done*. Penguin Books. NY, NY. 2003.
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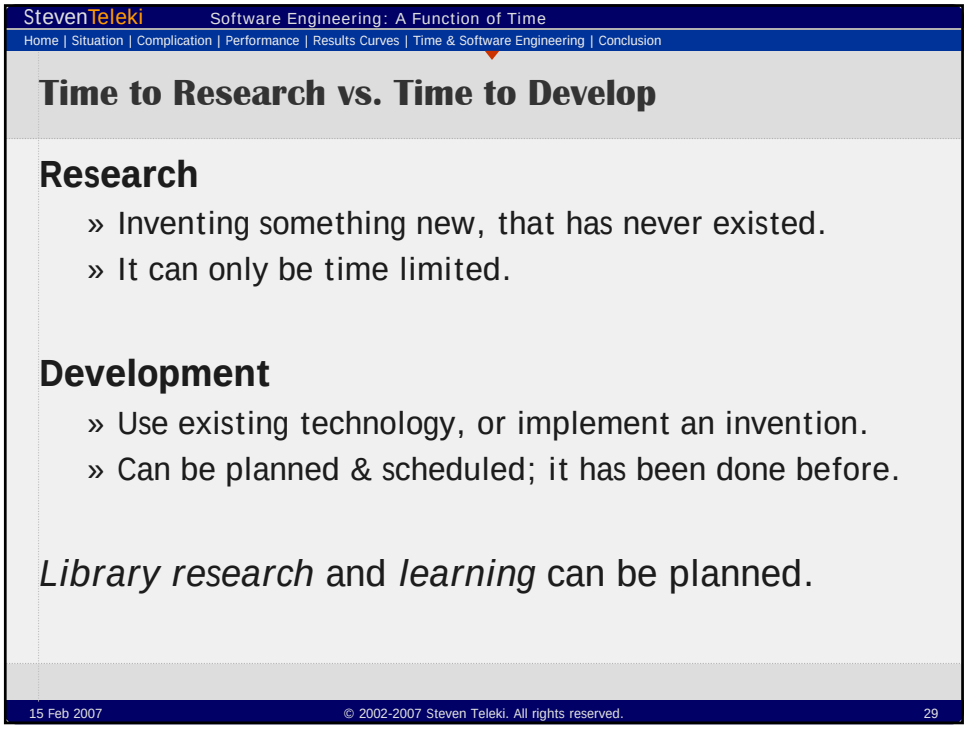
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Time to Research vs. Time to Develop
Research
» Inventing something new, that has never existed.
» It can only be time limited.
Development
» Use existing technology, or implement an invention.
» Can be planned & scheduled; it has been done before.
Library research and learning can be planned.
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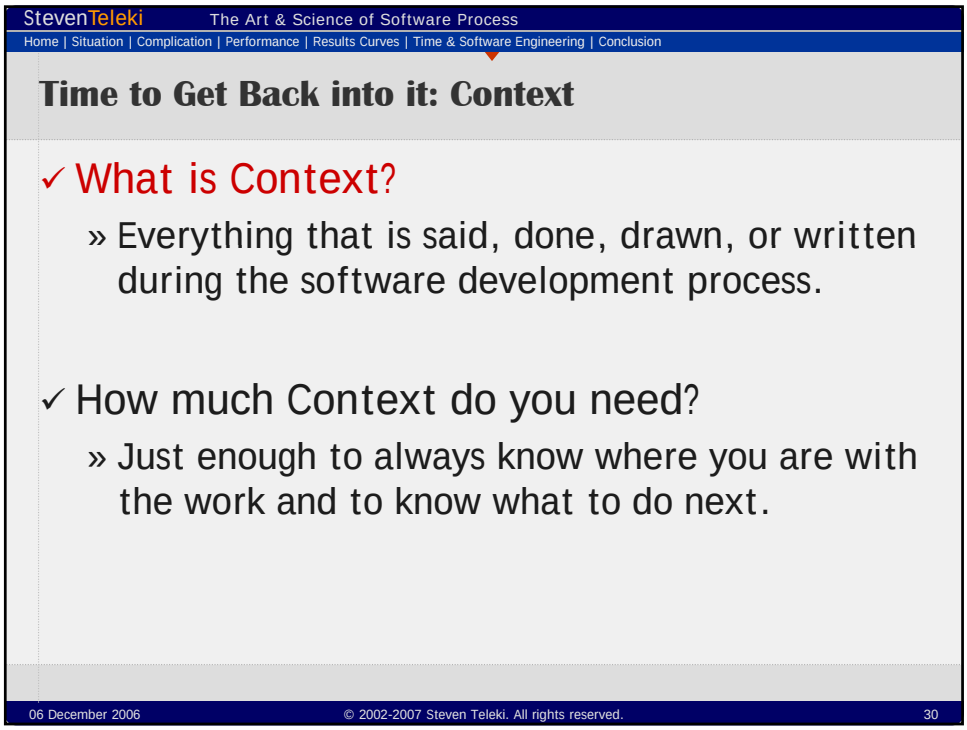
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Time to Get Back into it: Context
✓ What is Context?
» Everything that is said, done, drawn, or written during the software development process.
✓ How much Context do you need?
» Just enough to always know where you are with the work and to know what to do next.
06 December 2006
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Effective On-Task Time (EOT)

The time effectively spent on project work.

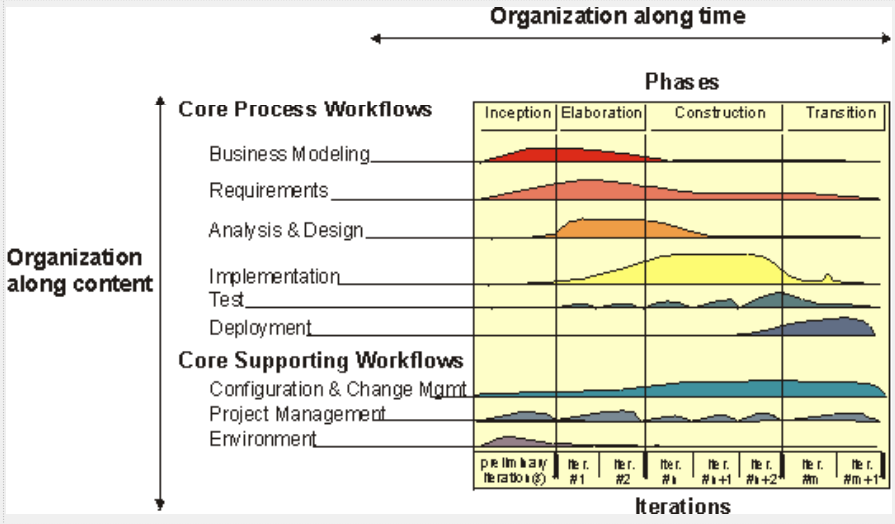
Doesn't include:

- » Reading email (usually even if it is project related)
- » Meetings (except well-defined project meetings)
- » Lunch time, breaks, phone conversations, etc.

Measure your EOT per week.

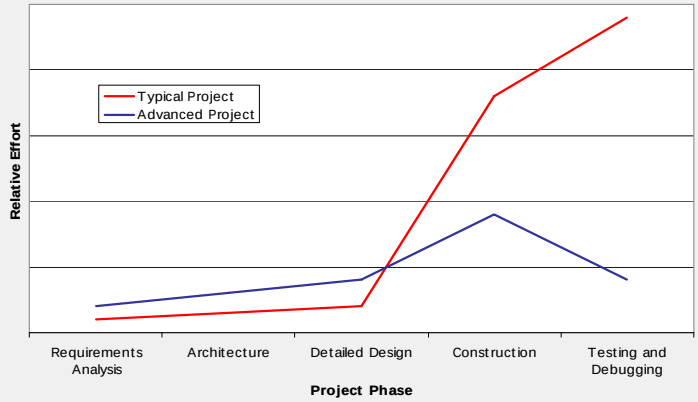
- » Best organizations in the world get 20+ hrs/week.
- » You may only get about 3-5 hrs/wk the first week. You should get up to 15 hrs/wk in a few weeks.

Time in the Software Life Cycle



The Late Effects of Added Time in the Early Phases

Relative Effort on a Typical vs. an Advanced Project

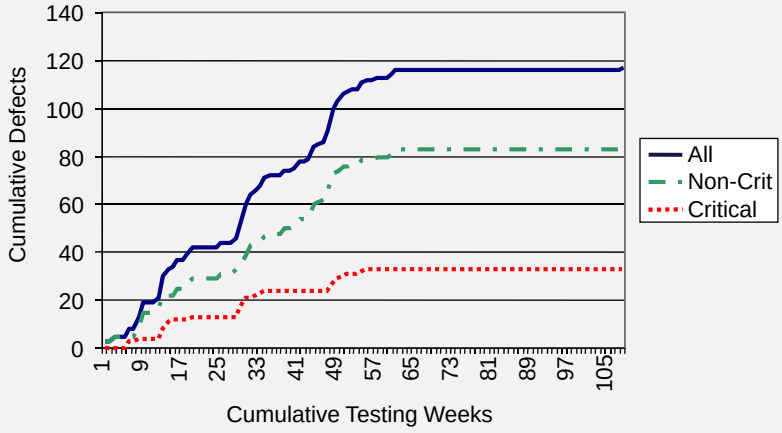


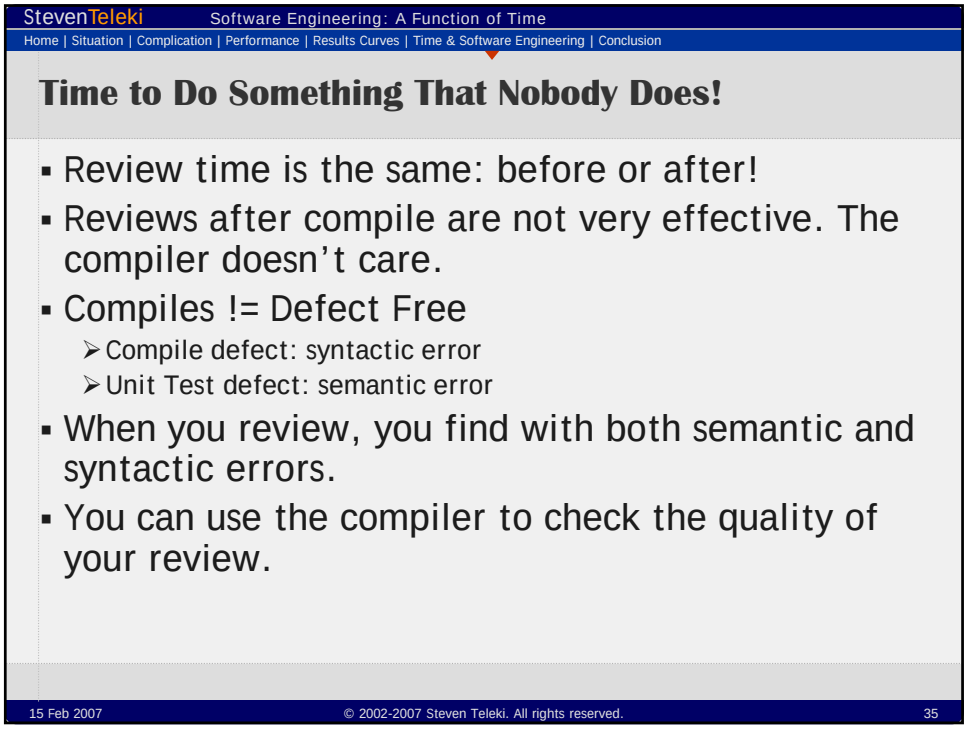
Advanced software development approaches require more work during the early stages of the project to eliminate enormous amount of unnecessary work in the later stages of a project.

McConnell, Steve. *After the Gold Rush.* Microsoft Press. 1999.

Time to Test

Voyager Spacecraft Total Defects in System Test

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Time to Do Something That Nobody Does!
Review time is the same: before or after!
Reviews after compile are not very effective. The compiler doesn't care.
Compiles != Defect Free
Compile defect: syntactic error
Unit Test defect: semantic error
When you review, you find with both semantic and syntactic errors.
You can use the compiler to check the quality of your review.
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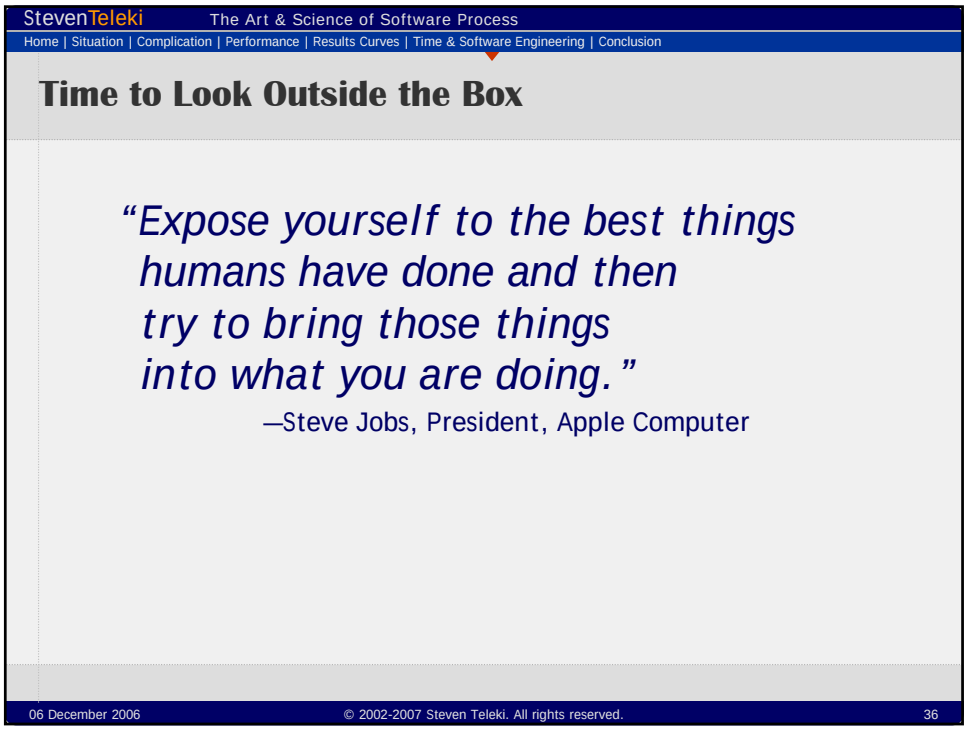
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Time to Look Outside the Box
"Expose yourself to the best things humans have done and then try to bring those things into what you are doing."
—Steve Jobs, President, Apple Computer
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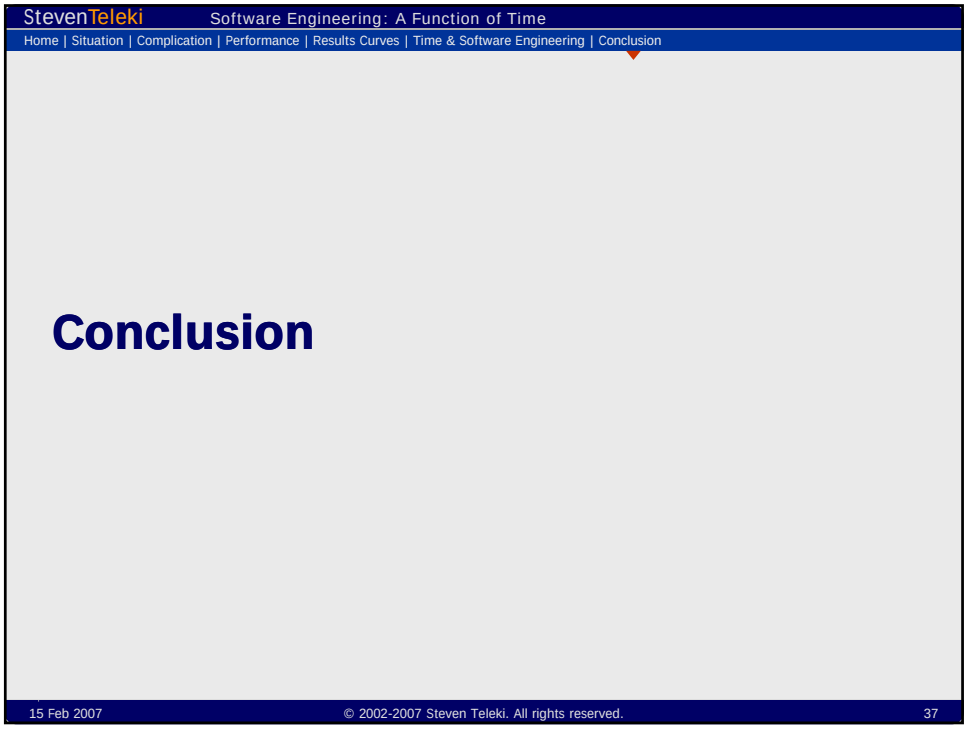
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Conclusion
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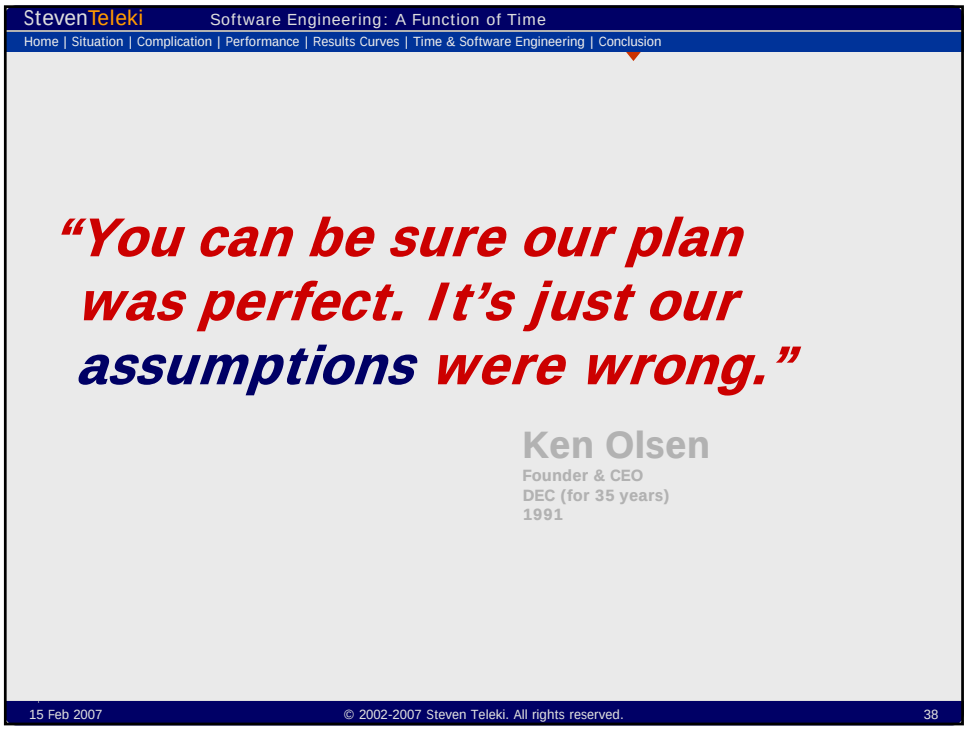
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"You can be sure our plan was perfect. It's just our assumptions were wrong."
Ken Olsen
Founder & CEO
DEC (for 35 years)
1991
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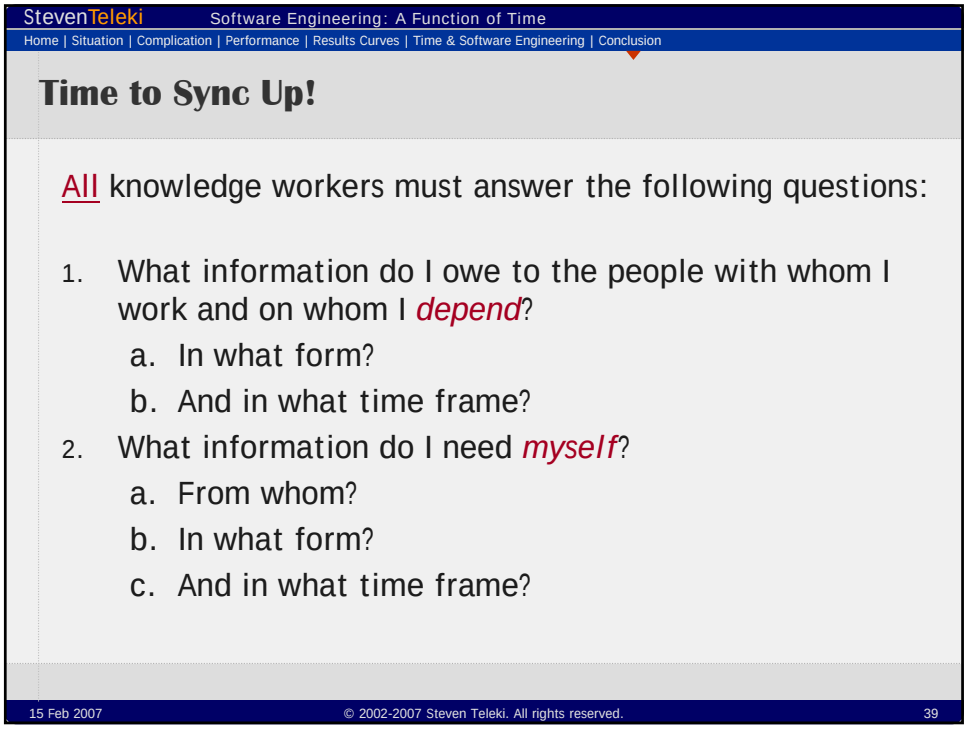
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Time to Sync Up!
All knowledge workers must answer the following questions:
1. What information do I owe to the people with whom I work and on whom I depend?
a. In what form?
b. And in what time frame?
2. What information do I need myself?
a. From whom?
b. In what form?
c. And in what time frame?
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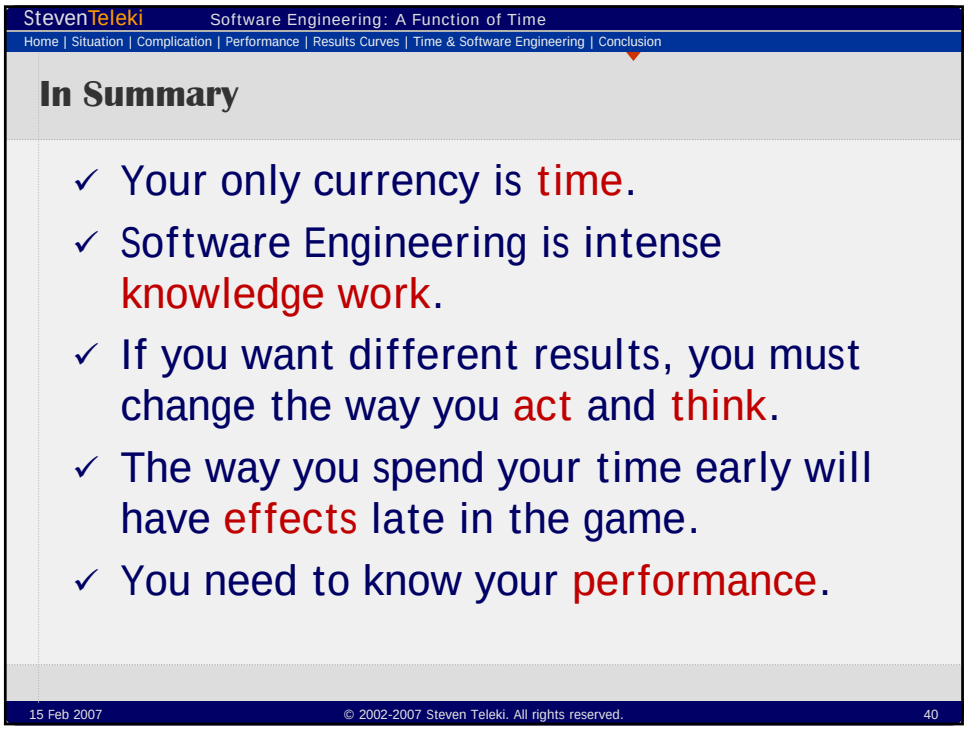
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In Summary
✓ Your only currency is time.
✓ Software Engineering is intense knowledge work.
✓ If you want different results, you must change the way you act and think.
✓ The way you spend your time early will have effects late in the game.
✓ You need to know your performance.
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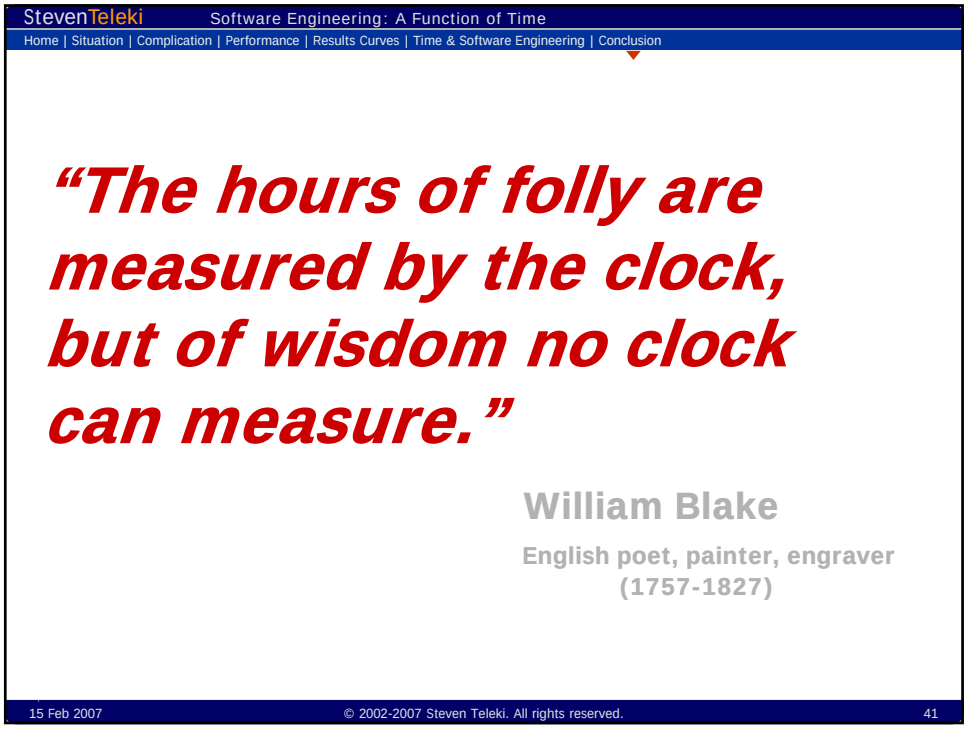
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"The hours of folly are measured by the clock, but of wisdom no clock can measure."
William Blake
English poet, painter, engraver (1757-1827)
15 Feb 2007
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Your Letters Are Welcome!
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For a software development reading list visit: http://steven.teleki.net/
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